Dtsch. Entomol. Z. 72 (2) 2025, 367–375 | DOI 10.3897/dez.72.165084

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für Natur MUSEUM FÜR NATURKUNDE BERLIN

Two new species of *Euphranta* Loew (Diptera, Tephritidae, Trypetinae, Adramini) from India

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https://zoobank.org/737EF25D-2766-4E5A-AFC1-CB03EC9530E3

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Academic editor: A. Camargo ♦ **Received** 14 July 2025 ♦ **Accepted** 14 October 2025 ♦ **Published** 10 November 2025

Abstract

Two new species of *Euphranta* Loew are described from India, namely *Euphranta goniothalami* David & Hancock, **sp. nov.** reared from seeds of an endemic shrub, *Goniothalamus keralensis* E.S.S. Kumar, Shaju, Roy & Raj Kumar, in Valara, Idukki district (which is a part of the Western Ghats mountains), and *Euphranta undulata* David & Hancock, **sp. nov.** from Meghalaya, Northeast India. An updated key to all *Euphranta* species known to occur in India is also provided.

Key Words

Idukki, Kerala, Meghalaya, Northeast India, Valara, Western Ghats

Introduction

Euphranta Loew belongs to Adramini, a tribe of Trypetinae (Diptera, Tephritidae) with 112 described species worldwide (Norrbom et al. 1999; Hancock and Drew 2004; David et al. 2013, 2020, 2021; David and Singh 2015; Hancock and Whitmore 2015). The genus is primarily distributed in the Oriental and Australasian Regions with a few representatives in the Palearctic and Nearctic Regions (Norrbom et al. 1999). The larvae are generally frugivorous and mostly monophagous (Hancock and Drew 2004) with a few species like *Euphranta dysoxyli* David, 2013 and *Euphranta haldwanica* Hancock & Goodger, 2013 reported attacking seeds (David et al. 2013). Some of the distinctive features of the genus are that the body is often elongate, the frons with two to three frontal setae, the wings banded, the anatergite with fine erect hairs, the epandrium bulbous with elongate surstyli much narrower than the epandrium, the proctiger hyaline, narrower than epandrium, the elongate oviscape, and the relatively short aculeus (David et al. 2021). Sixteen species were recorded in India by Singh et al. (2025). The objective of the present work is to describe two new species of *Euphranta* to the Indian fauna and provide an updated identification key.

Material and methods

The specimens examined in this study were deposited in the National Insect Museum (NIM) of the ICAR-National Bureau of Agricultural Insect Resources, Bengaluru, Karnataka, India. The images of the external structures were obtained using a Leica K3C camera attached to a Leica M205A stereozoom microscope whereas images of postabdominal structures were acquired using a Nikon DS Fi-3 camera attached to a Nikon Eclipse C*i* phase contrast mi-

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croscope. Images of postabdominal structures were stacked using Combine ZP (Hadley 2011). Terminology follows White et al. (1999) and Cumming and Wood (2017).

Taxonomy

Euphranta Loew, 1862

Euphranta Loew, 1862: 28. Type species: *Musca connexa* Fabricius, 1794: 350 (by monotypy).

Diagnosis. Slender bodied flies with two or three frontal setae, single orbital seta, ocellar seta reduced; wing hyaline with or without transverse bands; anatergite with fine erect hairs, midfemur without stout ventral spines, abdomen with elongate oviscape 1.5 to 2.0 times longer than aculeus, three spermathecae, aculeus short, epandrium often bulbous with lateral surstylus narrower than epandrium and 2–3 times longer than epandrium, and proctiger hyaline, narrower than epandrium, sparsely setose, without thick tuft of hairs/setae.

Key to species of *Euphranta* from India (modified from David et al. 2021)

1 Thorax with medial anepisternal seta anterior to phragma; wing largely dark in apical half with broad hyaline indentations and no dark transverse bands [*zeylanica* group: a similar species from Sri Lanka, *E. zeylanica* (Senior-White), lacks the broad subapical hyaline indentation in cell r_1] 2

– Thorax without medial anepisternal seta anterior to phragma; wing variably patterned 4

2 Wing with apical dark area connected to pterostigma, the hyaline indentation at apex of pterostigma in cell r_1 extending only to vein R_{4+5}; oviscape almost as long as abdomen (David et al. 2013: fig. 72) ..... *E. notabilis* (Wulp)

– Wing with apical dark area separated from pterostigma, the hyaline indentation at apex of pterostigma in cell r_1 extending to posterior margin; oviscape almost as long as abdominal tergites 3–6 3

3 Subcostal band weak, with a prominent fuscous spot on vein R_{2+3} at the level of pterostigma, spicules on distal end of eversible membrane conical, spermatheca hyaline (David et al. 2021: figs 1–9) ..... *E. flavothoracica* David, Hancock & Sachin

– Subcostal band well developed, without a prominent fuscous spot on vein R_{2+3} (Fig. 7), spicules on distal end of eversible membrane flat with 2–3 blunt projections (Fig. 9), spermatheca tubular, curved and densely covered with fine hairs (Fig. 10) ..... *E. goniothalami* David & Hancock, sp. nov.

4 Wing with 2 prominent dark transverse bands from pterostigma, including subcostal band from base extending to apex of cell m_4, and discal band extending to r-m and beyond (David et al. 2021: figs 25, 35) 5

– Wing without transverse bands from pterostigma (David et al. 2013: figs 23, 65; David et al. 2021: figs 14, 15) or at most one prominent dark transverse band from pterostigma (David et al. 2021: fig. 15); if with an isolated subcostal band, then band from pterostigma interrupted and misaligned along vein R_{4+5} (Bezzi 1913: fig. 35) or with well- developed costal submarginal band leaving a hyaline margin in cells r_{2+3} and r_{4+5} (David et al.2013: fig. 71) 9

5 Wing with a medial hyaline V-shaped marking extending from anterior margin to cell m_4 that does not reach posterior margin (David et al. 2013: fig. 70) [*lemniscata* group] ..... *E. lemniscata* (Enderlein)

– Wing without a medial hyaline V-shaped marking, the hyaline band from cell r_1 at apex of pterostigma reaching posterior margin 6

6 Wing with a large apical brown patch with an isolated longitudinal hyaline band in cell r_{2+3} (David et al. 2013: fig. 56; David et al. 2021: figs 34, 35) [*klugii* (formerly *signatifacies*) group] ..... *E. klugii* (Wiedemann)

– Wing with a complete or interrupted subapical hyaline transverse band, not with an isolated longitudinal hyaline band in cell r_{2+3} 7

7 Head with 2 frontal setae; face pale and unspotted; wing with subapical hyaline band strongly kinked or interrupted; apical hyaline area large, extending across cell r_{4+5} into cells r_{2+3} and m_1; pterostigma fuscous with a fulvous apical tip (David et al. 2013: figs 66–69; David et al. 2021: figs 24–25) [*crux* group] ..... *E. crux* (Fabricius)

– Head with 3 frontal setae; face with 2 black spots; wing with subapical hyaline band broad and continuous at least from vein R_{2+3} to posterior margin; apical hyaline area narrow and confined to cell r_{4+5}; pterostigma fulvous with a dark oblique medial band [*mikado* group] 8

8 Face with two elongate black marks along antennal foveae; dorsocentral setae vestigial or absent; wing with dark transverse band over crossvein dm-m quadrate and vertical in cell r_1; apex of aculeus with preapical indentations (David et al. 2013: fig. 7) ..... *E. dysoxyli* David

– Face with two subtriangular black spots; dorsocentral setae well developed; wing with dark transverse band over crossvein dm-m narrow and oblique in cell r_1; apex of aculeus acute and without preapical indentations (David et al. 2013: fig. 48; 2020: fig. 18) ..... *E. haldwanica* Hancock & Goodger

9 Wing with costal-submarginal band narrow and curved, leaving a hyaline margin in cells r_{2+3} and r_{4+5}, plus a large and isolated dark discal patch covering both crossveins dm-m and r-m (David et al. 2013: fig. 71) [*macularis* group] ..... *E. macularis* (Wiedemann)

– Wing without a curved costal-submarginal band and isolated dark discal patch covering both crossveins 10

10 Wing with 3 transverse dark bands and a dark subapical area, the subbasal band not connected to pterostigma and the 2 medial bands interrupted at vein R_{4+5} and misaligned; face wholly black; scutum and abdomen shiny black (Bezzi 1913: fig. 35) [*toxoneura* group] ..... *E. nigripeda* (Bezzi)
– Wing with 2 transverse dark bands and broad apical marking or often largely hyaline or with a single short band from pterostigma that does not reach posterior margin; face, scutum and abdomen often not wholly black 11
11 Wing with subcostal band and radial-medial band well separated (Fig. 18), aculeus tip blunt (Fig. 22) with wavy margin [*apicalis* group] ..... *E. undulata* David & Hancock, sp. nov.
– Wing with either subcostal band and radial-medial fused to form a V-shaped band or predominantly hyaline, aculeus tip not blunt 12
12 Head with 3 frontal setae; wing with an isolated subbasal black patch below apex of cell c, and a V-shaped black band from pterostigma connected with a transverse band over crossvein dm-m and a subapical dark area, leaving a triangular hyaline indentation in cell r_1 at apex of pterostigma (David et al. 2020: fig. 7) [*camelliae* group] ..... *E. siruvani* David, Hancock & Sankararaman
– Head with 2 frontal setae; wing without an isolated subbasal black patch and largely hyaline or with a complete hyaline crossband between dark bands from pterostigma and over crossvein dm-m 13
13 Wing with transverse band from pterostigma as wide as pterostigma and band over crossvein dm-m connected medially with subapical dark area that leaves a large apical hyaline patch (David et al. 2013: fig. 29) [*linocierae* group] ..... *E. thandikudi* David
– Wing with transverse band from pterostigma much narrower than pterostigma or absent and band over crossvein dm-m isolated or connected anteriorly with a reduced subapical dark area from posterior part of cell r_{4+5} and from cell m_1 14
14 Wing with a single transverse dark band from pterostigma that does not reach posterior margin; if confined to cell r_1 then crossvein r-m also infuscated; band over crossvein dm-m connected anteriorly with a subapical dark area that does not reach vein M_1 [*cassiae* group] 15
– Wing without a short transverse dark band from pterostigma; band over crossvein dm-m isolated and not connected with subapical dark area 16
15 All femora yellow, wing predominantly hyaline with transverse band from pterostigma reduced to cell r_1 only or narrowed to end at or before an infuscated crossvein r-m (David et al. 2013: fig. 65; David et al. 2021: figs 14, 15) ..... *E. cassiae* (Munro)
– Forefemur with apical one-third black, wing with transverse band from pterostigma reaching cell dm (David and Singh 2015: fig. 15) ..... *E. pseudocassiae* David & Singh
16 Face fulvous; apex of wing broadly dark brown without a hyaline apical spot; subapical band over crossvein dm-m fading and merging with anterior yellow-fumose area (David et al. 2013: fig. 16) [*chrysopila* group] ..... *E. diffusa* David
– Face mostly black or brown or with a large black patch; apex of wing with a large apical hyaline spot or wing largely hyaline to subhyaline and not yellow-fumose [ungrouped species] 17
17 Face fulvous with a large black patch near epistomal margin; wing with a broad and isolated infuscation over crossvein dm-m, a complete subapical dark band and a broad hyaline apical spot in cell r_{4+5} extending into cells r_{2+3} and m_1 (David and Singh 2015: fig. 3) ..... *E. wrightiae* David & Singh
– Face mostly black or brown; wing with band over crossvein dm-m faint and extending anteriorly to costa, apex broadly hyaline to subhyaline without a dark subapical band or distinct hyaline apical spot (David et al. 2013: fig. 23) ..... *E. hyalipennis* David & Freidberg

New species

Euphranta goniothalami David & Hancock, sp. nov.

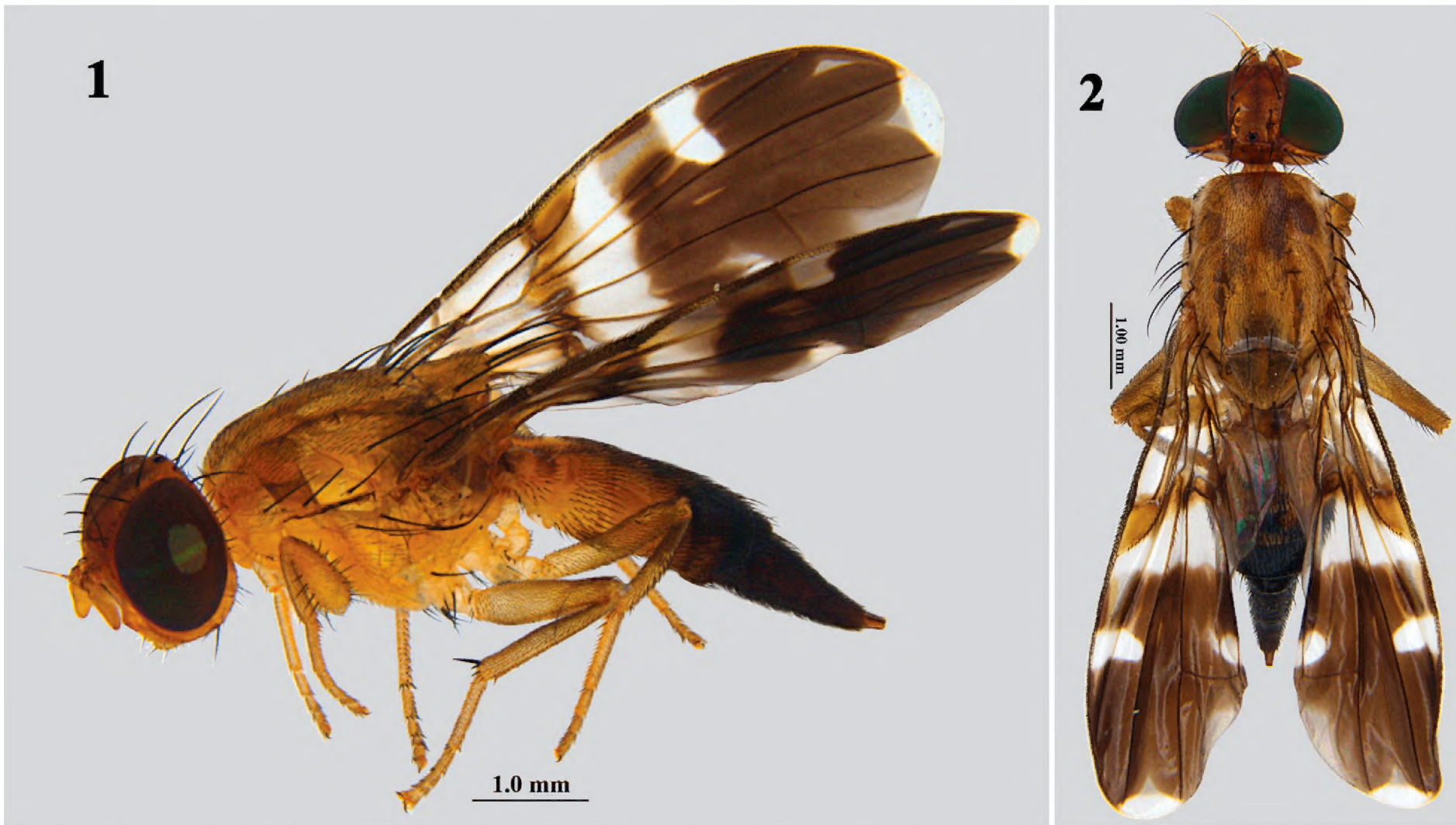
https://zoobank.org/8A4AB95C-2CD1-4DAE-91E9-481BC8BDEFA3
Figs 1–12

Type material. ***Holotype:*** ♀, India: Kerala, Idukki, Valara 10°04'16.81"N, 76°49'04.71"E, 05.i.2025, Reshma Elizabeth Alex (NIM). ***Paratype:*** 1♀, same data as holotype (NIM).

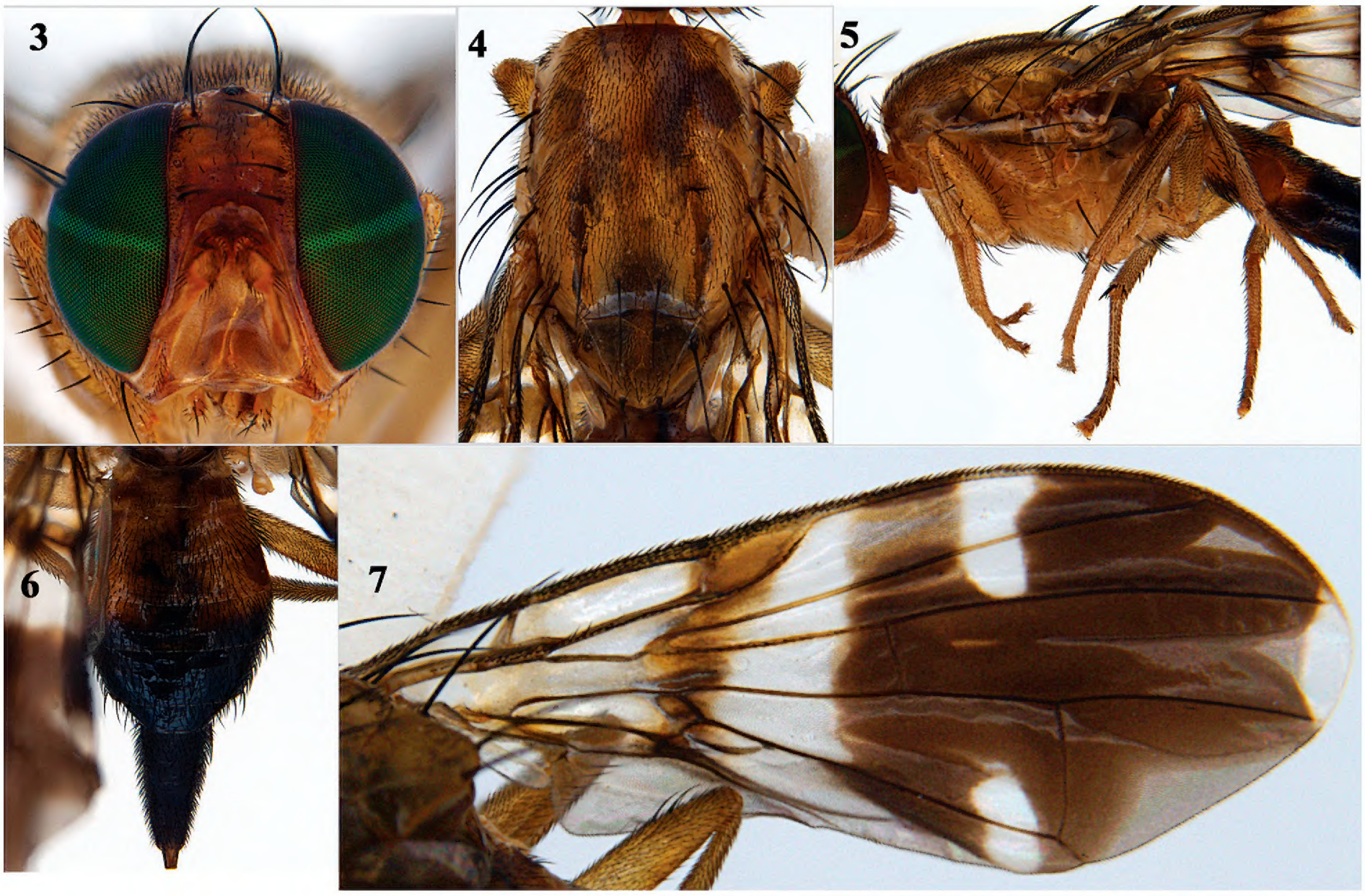
Etymology. The name of the species is derived from the host plant genus name *Goniothalamus* in genitive.

Differential diagnosis. This species is similar to *Euphranta flavothoracica* David, Hancock & Sachin, 2021 and *Euphranta laosica* Hardy, 1973 in external morphology and wing pattern, but can be differentiated from the former by the presence of a continuous subcostal band, conical apex of aculeus with preapical flange; curved, rod-shaped spermathecae densely covered with fine hairs, and blunt apex of spicules/scales on distal end of eversible membrane. It can be easily distinguished from *E. laosica* by the shorter oviscape (smaller than the length of the abdomen), and aculeus with preapical steps.

Description. Female (Figs 1, 2). Medium sized (5.73–5.90 mm). ***Head*** (Fig. 3). Slightly higher than long (height: 1.50–1.51 mm; length: 0.98–1.12 mm; length measured from base of scape to occiput); frons light fuscous with medial dark brown longitudinal vitta, three pairs of frontal setae (first two pairs closely placed; third pair placed at twice distance between first two pairs); single

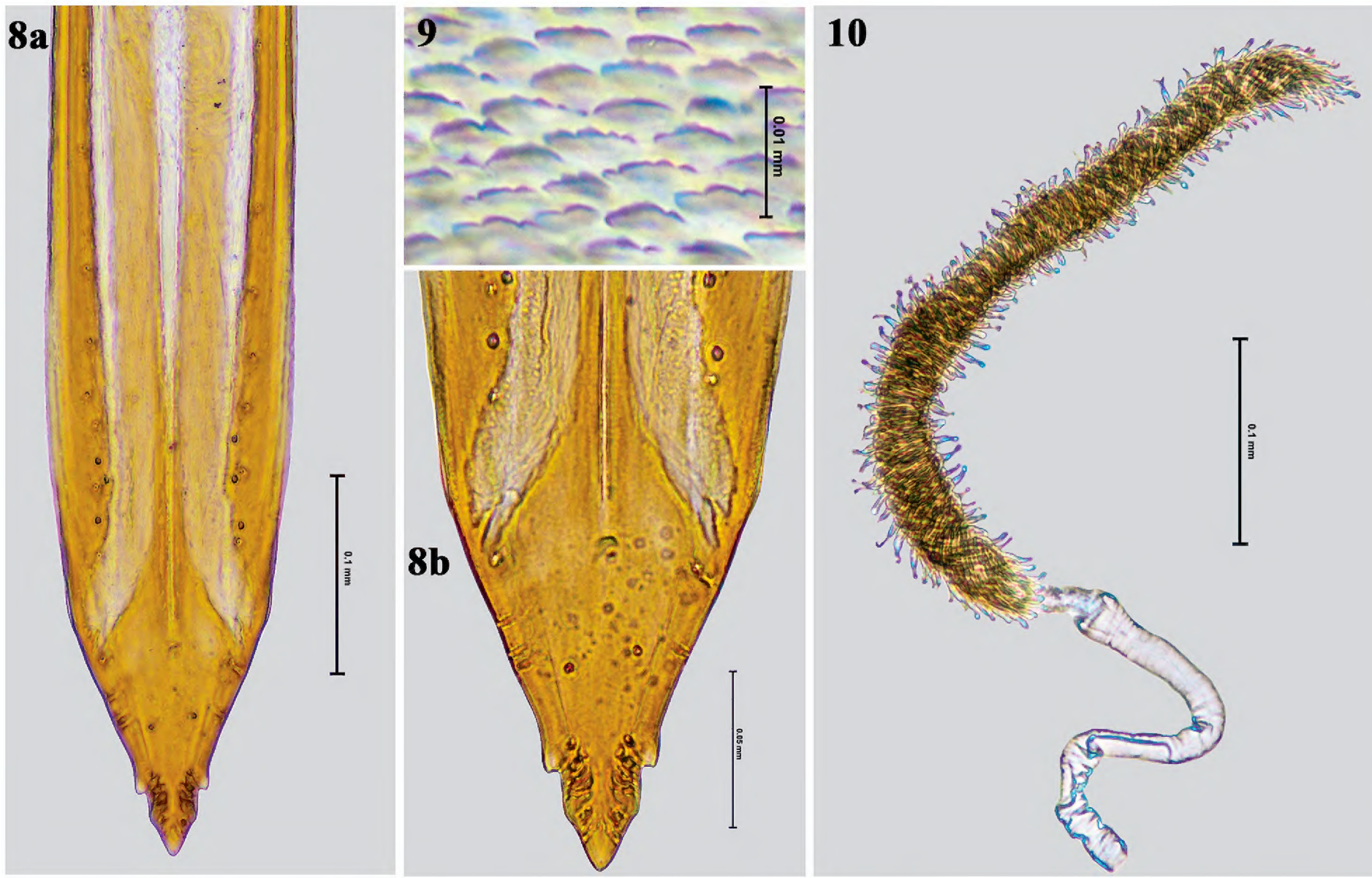


Figures 1, 2. Habitus of Holotype of *Euphranta goniothalami* David & Hancock, sp. nov. **1.** Lateral habitus; **2.** Dorsal habitus.



Figures 3–7. Holotype of *Euphranta goniothalami* David & Hancock, sp. nov. **3.** Head (frontal view); **4.** Thorax (dorsal view); **5.** Thorax (lateral view & legs); **6.** Abdomen; **7.** Wing.

reclinate orbital seta; ocellar seta reduced; ocellar tubercle glossy black; medial and lateral vertical setae present; postocellar seta developed; postocular setae thin and black; occiput fulvous; gena narrow. Scape, pedicel and postpedicel fulvous; combined length of antennal segments shorter than face, arista plumose. Face fulvous with medial concavity. ***Thorax*** (Figs 4, 5). Scutum (2.48–2.65 mm long; 1.66–1.68 mm wide) light fuscous with a pair of narrow,



Figures 8–10. Female postabdominal strucures of *Euphranta goniothalami* David & Hancock, sp. nov. **8.** Aculeus tip; **9.** Spicules on distal end of eversible membrane; **10.** Spermatheca.

postsutural dorsocentral stripes; postpronotal lobe and notopleuron fulvous, connected by fulvous/white band. Thorax with well-developed chaetotaxy: 2 scapular setae, 1 anterior notopleural, 1 posterior notopleural, 1 postsutural supra-alar, 1 postalar, 1 dorsocentral placed little behind level of postsutural supra-alar seta, 1 intra-alar, and 1 prescutellar acrostichal. Scutellum dark fuscous with 2 pairs of scutellar setae. Anepisternum fulvous with 3 setae arranged in triangular pattern, 1 anterior to phragma; anepimeron fulvous with single seta; katepisternum fulvous with single seta; anatergite dark fuscous with fine, erect hairs; katatergite fulvous; subscutellum and mediotergite light fuscous. ***Legs*** (Fig. 5). Fulvous without any dark fuscous to black markings; forefemur with 5–6 ventral setae, two rows of 10 dorsal setae; apex of mid tibia with prominent black spine like seta. ***Wing*** (Fig. 7). Medium sized (5.51–5.67 mm long); basal half hyaline, except subcostal band continuous from pterostigma to apex of vein m_4; apical half fuscous with hyaline indentations: hyaline indentation in cell r_1 extending to vein R_{4+5}, cell r_{2+3} with subhyaline preapical triangular patch, apex of cell r_{4+5} with narrow lens-shaped hyaline mark, hyaline marking in cell m_4 extending into cell dm, apex of cell m_1 with subhyaline indentation. ***Abdomen*** (Fig. 6). Slender (2.29–2.43 mm long; 1.31–1.33 mm wide), predominantly fulvous and black apically; tergites 1–3 fulvous with irregular black markings medially, tergite 4 partly fulvous, tergites 5 and 6 entirely black.

Female genitalia. Oviscape black (1.82 mm), eversible membrane (1.05 mm long) shorter than oviscape with spicules on distal end flat with 5–6 projections (Fig. 9); aculeus distinctly shorter (0.5 times) than oviscape with conical apex and preapical steps (Fig. 8a, b). Spermathecae elongate curved, densely covered with fine hairs (Fig. 10).

Remarks. This species was collected from infested fruits of *Goniothalamus keralensis* in Idukki district, Kerala during the studies on reproductive biology of the host plant by one of the coauthors. *Goniothalamus keralensis* is a rare endemic species of Annonaceae occurring in the Western Ghats. It is a medium-large sized shrub (Fig. 11), found along streams and riverbanks (Riverine/Riparian habitat). After pollination, the fruit development was recorded from May to June. Ripe fruits are observed by the end of August and beginning of September and fruiting season ends by November. Fruits are an aggregate of berries, spindle shaped, and greenish to orange-red in colour on maturation (Fig. 12). Being riverine, most of the seeds are dispersed through water. Seeds are endospermous and typical Annonaceous type. A high rate of seed feeding by larvae of *Euphranta goniothalami* sp. nov. was recorded in *G. keralensis* during fruiting seasons in 2022 and 2023 which severely affected the recovery of the species. In 2024, only two larvae were observed in 10 to 11 berries in an aggregate. However, a single larva was present in a single fruit. Two larvae from attacked fruits were collected on 19.11.2024 and two flies emerged on 05.01.2025. It took 42–45 days from the date of collection for the adults to emerge; egg, larval and pupal stage were not observed.

Figures 11, 12. Host plant of *Euphranta goniothalami*. **11.** Habitat of *Goniothalamus keralensis*; **12.** Fruits of *Goniothalamus keralensis*.

Euphranta undulata **David & Hancock, sp. nov.**
https://zoobank.org/6E625936-3F01-48CE-A887-81F8F8A9676A
Figs 13–22

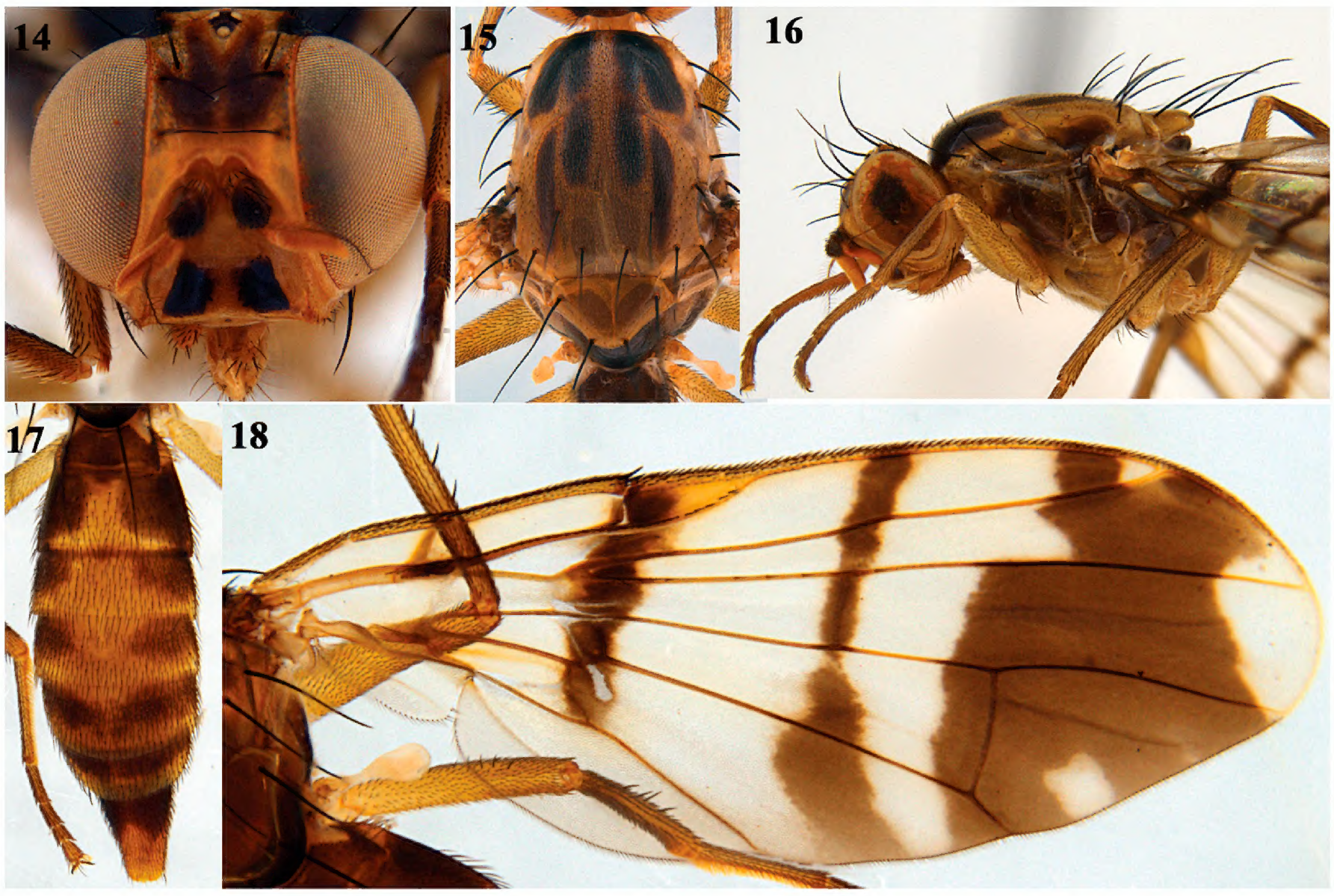
Type material. ***Holotype:*** ♀, India: Meghalaya, Umiam, Ri-Bhoi, 15.xi.2023, Niladri (NIM). ***Paratype:*** 1♀, same data as holotype (NIM).

Etymology. The species name *undulata* is derived from a Latin adjective *undulatus* meaning wavy, referring to the wavy margin of the aculeus tip.

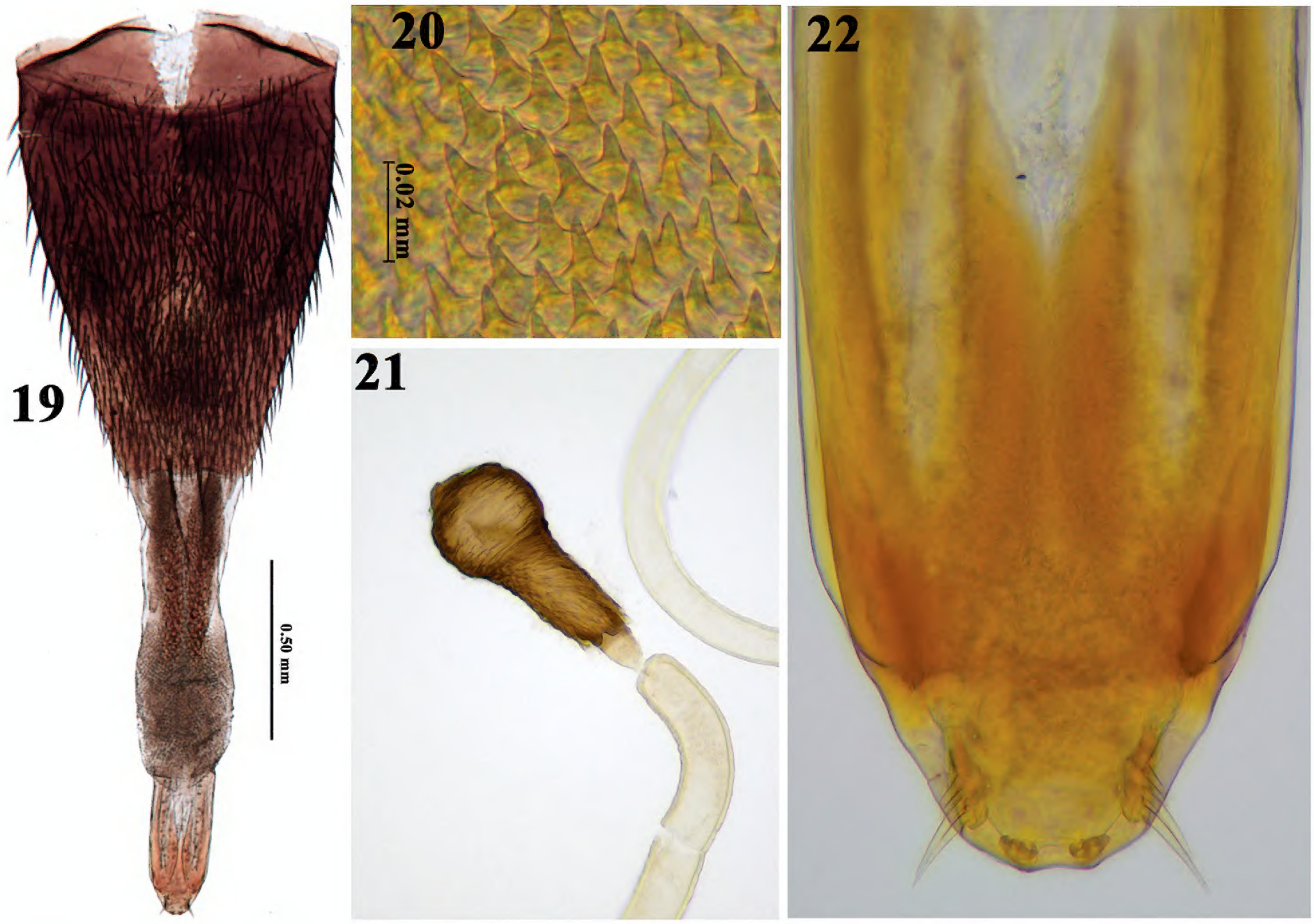
Differential diagnosis. This species is similar to *Euphranta apicalis* Hendel, 1915 originally described from Taiwan, in possessing two transverse bands and a subapical fuscous patch on the wing and in general morphology, but can be differentiated based on the narrower r-m crossband, irregular proximal margin of the subapical patch, broad aculeus tip with wavy margin.

Description. Female (Fig. 13). Medium sized (5.67–5.83 mm). ***Head*** (Fig. 14). as long as high (height: 1.20–1.29 mm; length: 1.12 –1.15 mm; length measured from base of scape to occiput); frons fuscous with broad, dark brown arrow head shaped mark with an anterior notch; two pairs of frontal setae; single, reclinate orbital seta; ocellar seta absent, ocellar tubercle glossy black; medial and lateral vertical setae present; postocellar seta absent, postocular setae thin and black; occiput fulvous with broad, glossy black band, from medial and lateral vertical setae to supracervical seta; gena narrow, fulvous with genal seta. Scape and pedicel dark fuscous to black, postpedicel fulvous; combined length of antennal segments shorter than face, arista plumose. Face fulvous with two broad quadrate patches towards epistomal margin. ***Thorax*** (Figs 15, 16). Scutum (2.26–2.31 mm long, 1.36–1.61 mm wide) fuscous with 2 pairs of broad, glossy black vittae on presutural area, lateral pair extended to transverse suture, submedial pair extending to level of postsutural supra-alar setae, on postsutural part with pair of black sublateral vittae between dorsocentral and intra-alar lines from base of transverse suture to level of postalar seta; postpronotal lobe and notopleuron fulvous. Thorax with well-developed chaetotaxy: 2 scapular setae, 1 anterior notopleural, 1 posterior notopleural, 1 postsutural supra-alar, 1 postalar, 1 dorsocentral placed little behind level of postsutural supra-alar seta, 1 intra-alar, and 1 prescutellar acrostichal. Scutellum dark fuscous with 2 pairs of scutellar setae. Anepisternum fuscous basally, fulvous apically with single seta posterodorsally, anepimeron fuscous to black with single seta, katepisternum fulvous with single seta, anatergite fuscous with fine, erect hairs, katatergite fuscous, subscutellum and mediotergite dark fuscous to black. ***Legs*** (Fig. 16). Fulvous, without any dark fuscous to black markings; forefemur without any strong ventral setae, two rows of 5–6 dorsal setae; apex of mid tibia with prominent black spine

Figure 13. Habitus (dorsal) of Holotype of *Euphranta undulata* David & Hancock, sp. nov.



Figures 14–18. Holotype of *Euphranta undulata* David & Hancock, sp. nov. **14.** Head (frontal view); **15.** Thorax (dorsal view); **16.** Thorax and legs (lateral view); **17.** Abdomen; **18.** Wing.



Figures 19–22. Postabdominal structures of *Euphranta undulata* David & Hancock, sp. nov., **19.** Ovipositor; **20.** Spicules on distal end of eversible membrane; **21.** Spermatheca; **22.** Aculeus tip.

like seta. ***Wing*** (Fig. 18). Medium-sized (5.18–5.54 mm long), hyaline basally with two transverse bands and broad fuscous marking on apical half with hyaline indentations. Subcostal band continuous from pterostigma to apex of vein CuA; radial-medial band narrow, constricted until cell dm, then broadening posteriorly; broad subapical patch hyaline apically, with small triangular hyaline indentation on apex of cell r_1, quadrate shaped indentation on cell m_1, and triangular indentation on proximal margin in cell r_{2+3}; apex of cell r_{4+5} with hyaline mark extending into cell r_{2+3}. ***Abdomen*** (Fig. 17). Slender (1.86–1.99 mm long; 0.67–0.89 mm wide), predominantly fuscous, tergite 1 dark fuscous to black, tergites 2–5 with black bands interrupted medially; tergite 6 with a complete band.

Female genitalia. Oviscape (Fig. 19) black basally and fulvous apically (1.10 mm long); eversible membrane (0.8 mm long) shorter than oviscape with conical spicules on distal end (Fig. 20); aculeus distinctly shorter (0.31 mm long) than oviscape with broad, flat apex with wavy margin (Fig. 22); spermathecae dark-brown, bulbous with elongate stalk (Fig. 21).

Remarks. This species was collected in traps with a liquid-based bait made using tender bamboo shoots and yeast for attracting bamboo-shoot fruit flies.

Acknowledgments

The senior author is grateful to Dr. S. N. Sushil, Director of the ICAR-NBAIR, Bengaluru for allowing the use of the facilities and for his support. We thank the Museum für Naturkunde, Berlin, for waiving the fees for publishing this paper. We are thankful to Dr. Allen Norrbom, Dr. Valery Korneyev, Dr Severyn Korneyev and an anonymous reviewer for their meticulous and constructive reviews which greatly helped in improving the manuscript.

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